of Humboldt, and edited an English translation of his *Cosmos* made by Mrs. Sabine. In 1830, in consequence of the disturbed state of Ireland, where his company of artillery was then stationed, he was required to join it; and he also served there, partly with his regiment and partly on the general staff of the army in Ireland, from 1833 to 1837.

He was elected a Fellow of the Royal Society on April 16, 1818, so that for the long period of sixty-five years he was a Fellow of that Society. His first paper, on the birds of Greenland, was communicated to the Linnean Society in the same year (1818); his contributions to science, therefore, cover no less than fifty-four years. He was Secretary of the Royal Society in 1827, in 1846 Foreign Secretary, in 1850 Vice-President and Treasurer. In 1861 he succeeded Sir Benjamin Brodie as President, and held the office until 1871. He was General Secretary of the British Association from 1839 to 1858, and was President at the meeting in Belfast in 1852. He was elected a Fellow of this Society on November 8, 1839.

He was awarded the Copley medal of the Royal Society in 1821, and a Royal medal in 1849; he also received the Lalande medal of the French Academy. He became lieutenant-colonel in 1851, and major-general in 1859. He was made a K.C.B. in 1869. He was an honorary member or associate of almost every foreign academy and scientific society of note. He died at his residence at London on June 26, 1883, in his ninety-fifth year, and was buried at Tewin beside his wife on June 30. For some time before his death his faculties had failed him. He leaves no family. J. W. L. G.

Henry John Stephen Smith was born on November 2, 1826, and was the fourth child of his parents. His father, John Smith, was a barrister-at-law, and graduated at Trinity College, Dublin, and afterwards at Brasenose College, Oxford, in order to shorten the residence at the Inns of Court that was requisite before he could be called to the bar. At the Temple he was the law pupil of Henry John Stephen, serjeant-at-law, the editor of "Blackstone's Commentaries," and the pupil gave the master's name to the younger of his two sons.

When Henry Smith was just two years old his father died. There were four children, two sons and two daughters, of whom the eldest, a girl, was but nine years of age; and to their education the widow thenceforth devoted herself. Chiefly in order to give her children the better opportunity of education which England afforded, Mrs. Smith left Ireland, and after spending some time in the Isle of Man, at Harborne near Birmingham, and at Leamington, she moved in 1831 to Ryde, in the Isle of Wight, where she remained for nearly ten years. Mrs. Smith was a most accomplished lady, and an intense delight in learning was one of the ruling impulses of her life. She taught her children herself, and until Henry was over eleven he remained

under her exclusive care and teaching. He was able to read when he was three years of age, and while still between four and five he began to display the desire for learning and the facility for acquiring knowledge that distinguished him ever afterwards. When he was between eleven and twelve his mother, who had been reading Greek plays, Herodotus and Thucydides with the boys, began to feel herself unable to cope with the further difficulties of Latin and Greek composition, and Mr. R. Wheler Bush became their tutor for some months. In a letter to the *Times* of February 12, 1883, Mr. Bush has given an account of the work of his pupil, from which the following is an extract:—

"In the years 1838–39 Henry Smith, then a boy of eleven years of age, read with me for about nine months at Ryde, in the Isle of Wight. He had been previously taught by his widowed mother—a remarkably clever and highly educated woman. After reading with Henry Smith I had a large experience of boys during a head-mastership of more than thirty-three years, but I have often remarked that the brilliant talents of Henry Smith prevented me from ever being really astonished at the abilities of any subsequent pupil. His power of memory, quickness of perception, indefatigable diligence, and intuitive grasp of whatever he studied were very remarkable at that early age. What he got through during those few months, and the way in which he got through it, have never ceased to surprise me. From a record which I have before me I see that during that short time he read all Thucydides, Sophocles, and Sallust, twelve books of Tacitus, the greater part of Horace, Juvenal, Persius, and several plays of Æschylus and Euripides. I see also that he got up six books of Euclid, and algebra to simple equations; that he read a considerable quantity of Hebrew; and that, among other things, he learnt all the Odes of Horace by heart. I could scarcely understand at the time how he contrived at his early age to translate so well and so accurately the most difficult speeches of Thucydides, without note or comment to guide him. He was a deeply interesting boy, singularly modest, lovable, and affectionate."

Mr. Bush was succeeded by two other tutors of less ability, and Mrs. Smith found that adequate teaching for Henry could not be obtained from resident tutors. She accordingly removed to Oxford in the autumn of 1840, when he became the daily pupil of the Rev. H. Highton. In the summer of 1841 Mr. Highton was appointed to a mastership at Rugby. He was accompanied by his pupil, who, being only fifteen, was disqualified by age from entering the sixth form, although possessed of sufficient knowledge. He was placed in the upper fifth and in "the twenty" until the Midsummer holidays of 1842, when having been allowed the privilege of bidding Dr. Arnold goodbye, as a boy who would commence the next term in the sixth form, he returned home, where the news of Dr. Arnold's sudden

death followed him the next day. He went back to Rugby, and soon became the head boy under Dr. Tait.

On the death of his elder brother from consumption, in September 1843 he was removed from Rugby, and remained with his family at Nice through the winter, almost without classical books and without even a Greek lexicon. He spent the summer of 1844 in Switzerland, and at the beginning of October it was thought that he should return to Rugby for a few weeks' preparation before going to Oxford to try for the Balliol Scholarship in November. He was successful in obtaining the scholarship, and joined his family at Rome before Christmas. The winter was one of great enjoyment to him, and he made rapid progress in knowledge and cultivation while studying diligently the antiquities of the city.

He accompanied his family in June 1845 to Frascati, where in August he was attacked by malaria, the effects of which invalided him for nearly two years. The winter was spent at Naples, the malady slowly wearing itself out. In May 1846 he was taken to Wiesbaden, where the waters rapidly restored him to fair health. It was not, however, thought expedient that he should resume his interrupted course at Oxford until Easter 1847. The intervening winter was spent at Paris, and like the preceding one was a time when he made rapid intellectual progress. He remembered with especial pleasure the lectures of Arago and Milne Edwards. After the Easter term of 1847 he was never to the time of his death absent from Oxford for a single term. In the summer of 1847 he once more visited Wiesbaden, returning with his family to England in October. Until his mother's death, in 1857, his vacations were all passed with his family, the Christmas and Easter vacations chiefly in London, and the summer in Germany, Switzerland, or Austria.

He won the Ireland Scholarship in the Lent term 1848, and obtained a first class both in the classical and mathematical schools in the Lent term 1849. He gained the Senior Mathematical Scholarship in 1851. He was elected a Fellow of Balliol in 1850, and resided in college till 1857, when, after his mother's death, his only surviving sister, Miss Eleanor E. Smith, came to Oxford, and from that time onwards they lived together. He was elected Savilian Professor of Geometry in 1861 in succession to Prof. Baden Powell, and in 1874 he was appointed Keeper of the University Museum. He then removed to the residence attached to the Museum, and lived there with his sister till his death.

After taking his degree he wavered between classics and mathematics, but not for long; the latter soon attracted him, and with a power that steadily increased from year to year. His first two papers, which were geometrical, were published in 1852 in the *Proceedings of the Ashmolean Society* and the *Cambridge and Dublin Mathematical Journal*. His next paper entitled "De Compositione numerorum primorum formæ $4\lambda+1$ ex

duobus quadratis," was published in *Crelle's Journal* for 1855. This was his first contribution to the subject to which he was to mainly devote his life, and with which his name will ever be associated. For the ten years from 1854 to 1864 he devoted himself to the Theory of Numbers, the most extensive and the most difficult of all the branches of pure mathematics, and made himself master of everything that had been published upon it. The results of this enormous amount of research are contained in his Report on the Theory of Numbers, which appeared in the British Association volumes from 1859 to 1865. Although incomplete, this magnificent Report occupies nearly 250 pages, and forms an enduring monument of the power and genius of its author. It is quite unique of its kind, and presents a comprehensive view of the actual state of the most intricate department of mathematics, and only those who have had occasion to make use of it can appreciate the wonderful grasp exhibited by the author of *all* the processes and methods and literature of the subject. It is a model of brief, clear, and precise exposition, and is remarkable for the same perfection of form, condensed mode of statement of processes, and what may be termed "mathematical good taste" that distinguished all his work.

Not only does the Report contain a complete account of the wonderful series of discoveries of Gauss and his successors, but there is also much original matter, though with characteristic modesty it is but rarely that it is distinguished in any way from theorems that are merely quoted. But the amount of original work that he accomplished was far greater than he could find room for in the Report, and the chief results of his own discoveries were communicated to the Royal Society in two elaborate memoirs on systems of linear indeterminate equations and congruences, and upon the orders and genera of ternary quadratic forms, which were printed in the *Philosophical Transactions* for 1861 and 1867. The two great divisions into which the Theory of Numbers may be divided are the Theory of Congruences and the Theory of Forms, and these papers contain contributions of the highest generality and importance to both branches of the subject. The solution of the problem of the representation of numbers by binary quadratic forms is one of the great achievements of Gauss, and the fundamental principles upon which the treatment of such questions must rest were given by him in the *Disquisitiones Arithmeticæ.* Gauss there added some results relating to ternary quadratic forms, but the extension from two to three indeterminates was the work of Eisenstein, who, in his memoir "Neue Theoreme der höheren Arithmetik," defined the ordinal and generic characters of ternary quadratic forms of an uneven determinant; and, in the case of definite forms, assigned the weight of any order or genus. But he did not consider forms of an even determinant, nor give any demonstrations of his work, and these omissions Prof. Smith supplied in his great memoir on the subject, which affords a complete classification of

ternary quadratic forms. Prof. Smith, however, did not confine himself to the case of three indeterminates, but succeeded in establishing the principles on which the extension to the general case of n indeterminates depend, and obtained the general formulæ; thus effecting the greatest advance made in the subject since the publication of Gauss's memorable work that so entirely changed the aspect of the whole Theory of Numbers. A brief account of Prof. Smith's methods and results appeared in the *Proceedings of the Royal Society* (vol. xiii., 1864, pp. 199–203, and vol. xvi., 1868, pp. 197–208) in two notices, "On the Order and Genera of Quadratic Forms containing more than Three Indeterminates." In the second of these notices, after giving the general formulæ, Prof. Smith remarks that, though the demonstrations are simple in principle, they require attention to a great number of details with respect to which it is very easy to fall into error, and he adds "so soon as they can be put into a convenient form they shall be submitted to the Royal Society;" but unfortunately he was closely occupied with other researches during all that remained of his life, and when death removed him so suddenly last year they still lay unpublished in his note-books.

In this second notice he also remarks at the conclusion that the theorems which have been given by Jacobi, Eisenstein, and in such great profusion by Liouville, relating to the representation of numbers by four squares and other simple quadratic forms, are deducible by a uniform method from the principles indicated in the paper, and he proceeds, "So also are the theorems relating to the representation of numbers by six and eight squares, which are implicitly contained in the developments given by Jacobi in the 'Fundamenta Nova.' As the series of theorems relating to the representation of numbers by sums of squares ceases, for the reason assigned by Eisenstein, when the number of squares surpasses eight, it is of some importance to complete it. The only cases which have not been fully considered are those of five and seven squares. The principal theorems relating to the case of five squares have indeed been given by Eisenstein (*Crelle's Journal*, vol. xxxv. p. 368); but he has considered only those numbers which are not divisible by any square. We shall here complete his enunciation of those theorems, and shall add the corresponding theorems for the case of seven squares." The class of theorems in question (viz. the number of representations of a number as a sum of squares) was shown by Eisenstein to be limited to eight squares. The solutions in the cases of two, four, and six squares may be obtained by means of Elliptic Functions, *i.e.* by purely algebraic methods, but the cases in which the number of squares is uneven involve the special processes peculiar to the Theory of Numbers. Eisenstein gave the solution in the case of three squares, and he also left a statement of the solution he had obtained in the case of five squares. His results, however, were

published without demonstration, and only apply to numbers having a particular form. Fourteen years later, in ignorance of Prof. Smith's work, the demonstration and completion of Eisenstein's theorems for five squares were set by the French Academy as the subject of their "Grand Prix des Sciences Mathématiques." When Prof. Smith saw the announcement of the prize subject, in February 1882, his time was engrossed with work relating to Elliptic Functions, and besides having a great dislike to become a competitor, especially under the circumstances, he was very reluctant to leave, even for a short time, the work he had in hand. At the request, however, of a member of the Commission by whom the prize had been proposed, he undertook to write out the demonstration of his general theorems so far as was required to prove the results in the special case of five squares. The dissertation was sent in by the day appointed (June 1, 1882), and only a month after his death, in March 1883, the prize of 3,000 francs was awarded to him, another prize being also awarded to M. Minkowski. No episode could bring out in a more striking light the extent of Prof. Smith's researches, or the distance he had advanced beyond his contemporaries than that a question of which he had given the solution in 1867 as a corollary from general formulæ which governed the whole class of investigations to which it belonged should have been regarded by the French Academy as one whose solution was of such difficulty and importance as to be worthy of their great prize. It affords, too, a singular illustration of the little attention that works destined to become classical attracted in the lifetime of their author. In the Royal Society's *Proceedings* Prof. Smith's statement of his results relating to five squares and seven squares occupy but a single page, but his dissertation (which has been printed by the French Academy), although it only relates to the case of five squares, occupies 72 pages. Many of the propositions contained in it are general, but the demonstrations are not supplied for the case of seven squares.

Prof. Smith was also the author of important papers in which he succeeded in extending to complex quadratic forms many of Gauss's investigations relating to real quadratic forms.

He was led by his researches on the Theory of Numbers to the Theory of Elliptic Functions; and on this subject he has published since 1864 results scarcely inferior in importance to his achievements in the former theory. His third subject was Modern Geometry, in which he was without a rival in this country, and of which he showed the same perfect mastery. Pure mathematics is divisible into two great branches, the Theory of Numbers, or "Arithmetic," *i.e.* the theory of discrete magnitude, and Algebra, the theory of continuous magnitude, the aims and methods of the two subjects being quite distinct. A characteristic of Prof. Smith's work, no less than of Gauss's, is the "arithmetical" mode of treatment that runs through the whole of it, no matter what the subject; and his

great command over the processes of this science is everywhere conspicuous. Special reference ought to be made to one paper of his in the *Atti* of the Accademia dei Lincei for 1877, in which he established a very remarkable analytical relation connecting the modular equation of order n and the theory of binary quadratic forms belonging to the positive determinant n. In this paper the modular curve is represented analytically by a curve in such a manner as to present an actual geometrical image of the complete systems of the reduced quadratic forms belonging to the determinant, and a geometrical interpretation is given to the ideas of *class*, *equivalence*, and *reduced form*. His papers on Elliptic Functions and the higher singularities of curves were published chiefly in the *Proceedings of the Mathematical Society*. At the time of his death he was engaged on a memoir on the "Theta and Omega Functions," which he left nearly complete, 150 quarto pages of it being in type; the latter portion, however, had not been revised in proof by him. This was the memoir which he was forced to lay aside for a time, in order to write out from his notes of 1866–67 the dissertation on the problem of five squares for the French Academy.

In 1868 he was awarded the Steiner prize of the Berlin Academy for a geometrical memoir "Sur quelques Problèmes cubiques et biquadratiques." He was asked to contribute to the memorial volume to Chelini, published at Milan in 1881 by Cremona and Beltrami, and he wrote a paper in Latin on continued fractions. He also wrote the introduction to the collected edition of Clifford's mathematical papers (1882).

Prof. Smith's collected mathematical works will be issued by the Oxford University Press in two volumes quarto. His lectures on Geometry and Theory of Numbers will also be published as text-books, the former being reproduced from the notes of pupils who attended them.

In the early years of his work he had published his researches but sparingly, and it was only as the mass of results accumulated that the necessity for publication pressed itself upon him. The excellence and completeness that distinguished all that Gauss ever published was a characteristic of Prof. Smith's work, and, as in Gauss's case, it was the result of extreme thought and care and elaboration. He was a great admirer of Gauss, and the following words of his relating to Gauss are quoted here in their entirety, as they perfectly describe, and in his own language, the objects which Prof. Smith himself so successfully kept in view in all that he wrote:—

"If we except the great name of Newton (and the exception is one which Gauss himself would have been delighted to make), it is probable that no mathematician of any age or country has ever surpassed Gauss in the combination of an abundant fertility of invention with an absolute rigorousness in demonstration, which the ancient Greeks themselves might have envied. It may be admitted, without any disparagement to the eminence of such

great mathematicians as Euler and Cauchy, that they were so overwhelmed with the exuberant wealth of their own creations, and so fascinated by the interest attaching to the results at which they arrived, that they did not greatly care to expend their time in arranging their ideas in a strictly logical order, or even in establishing by irrefragable proof propositions which they instinctively felt, and could almost see, to be true. With Gauss the case was otherwise.

'It may seem paradoxical, but it is probably nevertheless true, that it is precisely the effort after a logical perfection of form which has rendered the writings of Gauss open to the charge of obscurity and unnecessary difficulty. The fact is that there is neither obscurity nor difficulty in his writings as long as we read them in the submissive spirit in which an intelligent schoolboy is made to read his Euclid. Every assertion that is made is fully proved, and the assertions succeed one another in a perfectly just, analogical order; there is nothing so far of which we can complain. But when we have finished the perusal we soon begin to feel that our work is but begun, that we are still standing on the threshold of the temple, and that there is a secret which lies behind the veil, and is as yet concealed from us. . . . No vestige appears of the process by which the result itself was obtained, perhaps not even a trace of the considerations which suggested the successive steps of the demonstration. Gauss says, more than once, that for brevity he only gives the synthesis, and suppresses the analysis of his propositions. *Pauca sed matura* were the words with which he delighted to describe the character which he endeavoured to impress upon his mathematical writings. If, on the other hand, we turn to a memoir of Euler's, there is a sort of free and luxuriant gracefulness about the whole performance which tells of the quiet pleasure which Euler must have taken in each step of his work; but we are conscious, nevertheless, that we are at an immense distance from the severe grandeur of design which is characteristic of all Gauss's greater efforts. The preceding criticism, if just, ought not to appear wholly trivial, for though it is quite true that in any mathematical work the substance is immeasurably more important than the form, yet it cannot be doubted that many mathematical memoirs of our own time suffer greatly (if we may dare to say so) from a certain slovenliness in the mode of presentation, and that (whatever may be the value of their contents) they are stamped with a character of slightness and perishableness which contrasts strongly with the adamantine solidity and clear, hard modelling which (we may be sure) will keep the writings of Gauss from being forgotten long after the chief results and methods contained in them have been incorporated in treatises more easily read, and have come to form a part of the common patrimony of all working mathematicians. And we must never forget (what in an age so fertile of new mathematical conceptions as our own we are only too

apt to forget) that it is the business of mathematical science not only to discover new truths and new methods, but also to establish them, at whatever cost of time and labour, upon a basis of irrefragable reasoning.

"The μαθηματικὸς πιθανολογῶν has no more right to be listened to now than he had in the days of Aristotle; but it must be owned that since the invention of the 'royal roads' of analysis, defective modes of reasoning and of proof have had a chance of obtaining currency which they never had before. It is not the greatest, but it is perhaps not the least, of Gauss's claim to the admiration of mathematicians, that while fully penetrated with a sense of the vastness of the science, he exacted the utmost rigorousness in every part of it, never passed over a difficulty as if it did not exist, and never accepted a theorem as true beyond the limits within which it could actually be demonstrated."

These words describe not only Prof. Smith's views but the quality of his own work. His one care was that it should be imperishable; and the words "adamantine solidity" express better than any others could do the character of what he has left. He spared no time or pains that his work should be as complete in its details as in its main results, and that it should be as perfect in form as in substance. He wished that what he did should be done for all time, and that it should also receive from his own hand the form which it was to retain.

He was President of Section A of the British Association at Bradford in 1873 and of the Mathematical Society in 1874–76, and the presidential addresses which he delivered at Bradford and on vacating the latter office are masterpieces of graceful writing that bear record to his wonderfully extensive knowledge and rare combination of gifts. As an expounder of mathematics before an audience he was unsurpassed for clearness, and his singular charm of manner gave him a remarkable power of fixing the attention of those present. Perhaps his faultless method of exposition and peculiar grace of manner were never more apparent than at the Mathematical Society on December 12, 1882—the last occasion on which he was ever to lay before a society the results of his wonderful power of penetration into the innermost structure, as it were, of mathematical truth.

His contributions to general literature were not numerous; a memoir of his friend Prof. Conington and an essay on the Plurality of Worlds were the most important. The articles on Arithmetical Instruments and on Geometrical Instruments and Models which he wrote for the handbook published in connection with the Special Loan Exhibition of Scientific Apparatus at South Kensington in 1876, should also be noticed.

He was appointed a member of the Royal Commission on Scientific Instruction and the Advancement of Science in 1870 on the death of Prof. W. A. Miller; and he was also a member of the Oxford University Commission, appointed in 1877. On

both Commissions a great deal of very heavy work was performed by him; and knowing how short was to be the time for which he was to be spared, it is impossible not to regret the great amount of time and anxiety that were thus exacted from him. A considerable portion of the report of the former Commission, including the part which related to the Universities of Oxford and Cambridge, was drafted by him.

In 1877, on the reconstitution of the managing body of the Meteorological Office, as recommended by the Treasury Commission in 1876, Prof. Smith was requested to accept the chairmanship of the new council. This office, which involved weekly visits to London, in addition to council meetings, which usually took place once a fortnight, he still held at his death. During the five years and a half of his presidency, he never missed a meeting, and he always devoted at least two hours to the consideration of the business on the agenda paper. The Minutes were always revised by him in manuscript before they were printed. In 1879 he was requested by the Council to attend the International Meteorological Congress at Rome, where his wide and varied knowledge and great personal influence made themselves felt throughout the whole meeting and contributed greatly to its success.

He was elected a Fellow of the Royal Society in 1861. On April 12 of the same year he was elected a Fellow of this Society. He was an LL.D. of Cambridge and Dublin.

It is difficult to give an idea of the position Prof. Smith held in Oxford and in society generally, so brilliant were his attainments, and so great and so varied his personal and social gifts. In an article on him in the *Times* of February 10, 1883, it was truly said: "It is probable that of the thousands of Englishmen who knew Henry Smith, scarcely one in a hundred ever thought of him as a mathematician at all . . . He was a classical scholar of wide knowledge and exquisite taste, and there were few who talked to him on English, French, German, or Italian literature who were not struck by his extensive knowledge, his capacious memory, and his sound critical judgment." The writer might have added that, even of the few who did think of him as a mathematician, there were fewer still who had any suspicion of the place he held in mathematical science, or of his intense devotion to the subject. The following extracts from the *Spectator* of February 17 will help to convey some impression of his personal character: "Many even of those who are aware that a man in the fulness of his powers is just dead, whose brilliant intellectual attainments have probably not been surpassed by any other of their English contemporaries may, nevertheless, be surprised at regret so widely felt and so loudly expressed over the loss of one who wrote no great books, patented no great invention, amassed no fortune, made no famous speeches, and led no conspicuous movement, political or social. Measured by the popular measure of publicity and fame, Prof. Henry Smith would

hardly seem to most of us to have been one of the great men of the time. Yet it would be difficult, among the world's celebrities, to find one who in gifts and nature was his superior . . . His mental attainments were of the highest order. A finished classical scholar, a mathematician, in some respects of European distinction, a considerable metaphysician, a trained master of most branches of knowledge, literary, economic, and scientific, an adequate linguist, and a man of sound judgment, perfect temper, and wise aptitude for affairs, he combined with his other special excellences a delicate gaiety of spirit, a brilliant conversational power, which made him one of the most accomplished and attractive ornaments of any educated company in which he moved. . . . Vanity or self-seeking, every form of mental intemperance and extravagance, seemed to have no place in anything that he ever said or did . . . Among the many friends, acquaintances, admirers, whose thoughts have in the last few days been saddened or sobered by the unexpected death of a brilliant man of genius, there are none who will not readily accord to Prof. Henry Smith the tribute of unaffected respect for what, without extravagance, may be termed his extraordinary powers of mind, his gentle and Lælian wisdom, and the sweetness of character which never made an enemy, lost a friend, or sought a personal advantage for itself." Referring to his influence at Oxford the article proceeds: "For nearly thirty years no more attractive, brilliant, or genial figure was to be found in the perturbed society of the University. Some happy combination of judgment and temper made him acceptable even to those with whose opinions he had nothing in common. He had the great art of never pressing a victory home, and of bearing defeat with pleasant equanimity. His business powers, his modesty, his wisdom, and his entire freedom from egotism and dogmatic presumption, a delicate gaiety that never flagged, wit that sparkled without wounding, and which rose incessantly to real brilliancy, made him not merely an effective personage in the Oxford world, but universally acceptable in any society, whatever the shade of its opinions . . . As by degrees his attainments were recognised, both in England and abroad, his influence at Oxford naturally deepened, but neither within nor without the University did he grasp at opportunities of notoriety. Such power and authority as he possessed he held without an effort, without solicitation, apparently without any personal satisfaction in them. In offices of friendship he was constant; in such public or civic duties as came in his way, assiduous; no good or benevolent work ever needed a helping hand but his was at its service, without ostentation and without any expectation of personal advantage." The notice of him in the *Athenæum* closed with the words: "No one, probably, has ever had a larger circle of private friends to lament his loss. He had all the gifts which win and preserve attachment; not only sincerity, constancy, depth of feeling and liveliness of sympathy, but a sweetness and nobility of nature to which no words can render adequate testimony."

In commenting on his nomination as one of the Oxford University Commissioners, Mr. Grant Duff said in the House of Commons: "The Savilian Professor of Geometry is not merely in the first rank of European mathematicians, but he would be a man of very extraordinary attainments even if you could abstract from him the whole of his mathematical attainments. He was the most distinguished scholar of his day at Oxford . . . But Prof. Smith's extraordinary attainments are the least of his recommendations for the office of Commissioner. His chief recommendations for that office are the solidity of his judgment, his great experience of Oxford business, his services on the Science Commission, and his conciliatory character, which has made him perhaps the only man in Oxford who is without an enemy, sharp as are the contentions of that very divided seat of learning." Those who knew Prof. Smith will feel that even these quotations fail to convey any adequate idea of the extent and brilliance of his attainments and powers.

The amount of time and thought that he devoted to the Royal Commissions, Boards of Delegates at Oxford, the Meteorological Office, and Committees and Councils of Societies, was very great, and it seems almost incredible that one who lived so active and busy a life, passed in the midst of men and affairs, should have been the author of mental achievements in the most abstract and complicated of the sciences, which will rank as scarcely second to any in the century. His influence and position he owed to his personal qualities alone, and many of those who thought they knew him best had the least idea how incessantly he was occupied with mathematical researches. The cold severity of his mathematical writings forms a curious contrast to the brilliant gaiety of his manner, and future generations, who will know him only from his writings, will find it hard to believe what they will find recorded of their author. In the character of his work he closely resembles Gauss, but no two lives could be more different.

An accident to his leg confined him to his sofa during part of 1882, but he seemed to have nearly recovered from its effects when he was seized with the illness which so soon carried him off. He was a regular attendant at the Council Meetings of this Society, and, at the time of his death, was a Vice-President. At the meeting of Council on February 2, 1883, the writer of this notice received from him at Burlington House a letter—almost the last which he ever wrote—in which he said: "I cannot be at the R. A. S. to-morrow. It is no fault of mine . . . I shall see you on the ninth, I hope." The ninth was the date of the Anniversary Meeting, but at seven o'clock on that morning he died, and the first words spoken by the President, on taking the chair, were to announce to the Fellows the loss they had just sustained. He was buried at Oxford on February 13: conspicuous among those who stood by his grave was Mr. Spottiswoode, himself so soon to be removed.

J. W. L. G.